SIEMENS

ARCADIS Orbic

SP

Installation and Start-up

System

3D Reconstruction

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Notes and symbols

Emphasized texts in technical documentation have the following meaning:

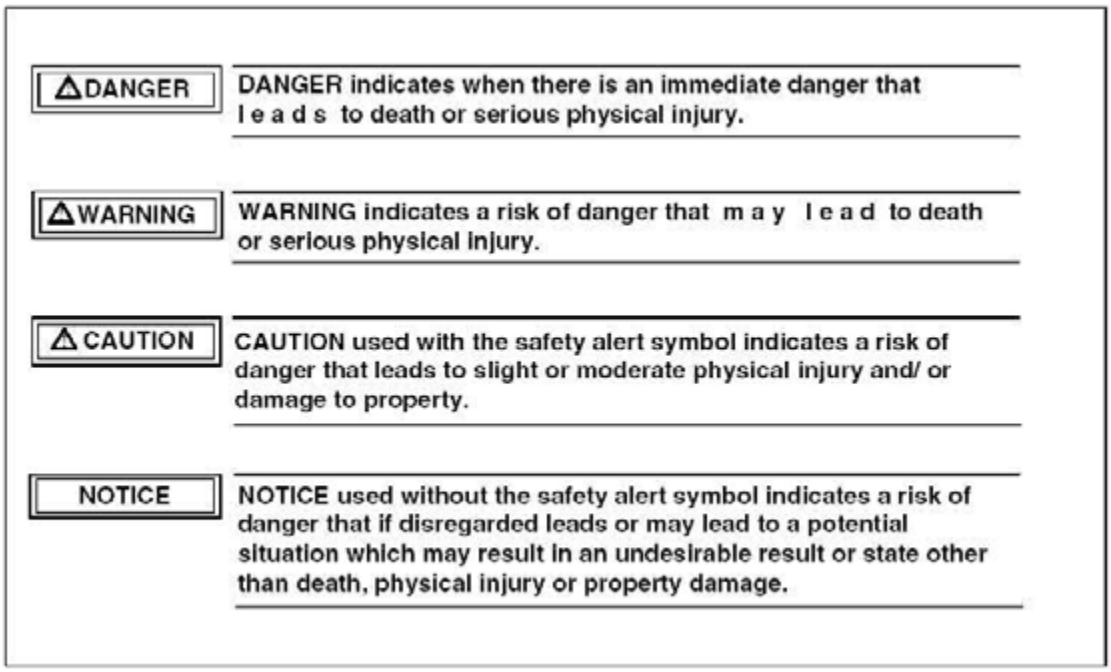
⚠DANGER
DANGER indicates when there is an immediate danger that leads to death or serious physical injury.
⚠WARNING
WARNING indicates a risk of danger that may lead to death or serious physical injury.
⚠CAUTION
CAUTION used with the safety alert symbol indicates a risk of danger that leads to slight or moderate physical injury and/ or damage to property.
NOTICE
NOTICE used without the safety alert symbol indicates a risk of danger that if disregarded leads or may lead to a potential situation which may result in an undesirable result or state other than death, physical injury or property damage.

Fig. 1: Safety notes

Safety information

Measuring the ground wire resistance

- After all work has been completed and all covers have been attached, perform the ground wire measurement according to ARTD-002.731.17.
- The ground wire resistance must not exceed 0.2 ohms

NOTICE

➪ **Prior to performing work, disconnect the power plug of the ARCADIS Orbic 3D.**

- This document describes the individual steps required to install the 3D option in the installed base - in this case the ARCADIS Orbic 3D.

⚠WARNING

Danger of possibly fatal physical injury and property damage!

Noncompliance can lead to death, physical injury or property damage.

Strictly follow:

➪ **The product-specific safety information in these instructions**

➪ **The general safety information in instructions TD00-000.860.01... and**

➪ **The general safety information according to ARTD part 2.**

⚠WARNING

Electrical voltage!

Noncompliance can lead to death, physical injury or property damage.

➪ **Removing the system covers exposes voltage-conducting parts. To avoid danger, always disconnect the system from the line voltage before removing the covers. To do this, unplug the power plug or switch the system power supply off and secure the power switch against accidental activation.**

➪ **If an uninterruptible power supply (UPS) is installed in the system, the power supply of the UPS must additionally be switched free of voltage or the voltage output plug must be unplugged.**

➪ **If service in connection with electrical voltage is required, the generator safety information in instructions TD00-000.860.01... must be observed.**

⚠WARNING

Electrical voltage!

Noncompliance can lead to death, physical injury or property damage.

- ➪ **After completing service work and reattaching all covers, a ground wire test must be performed according to ARTD-002.731.17.. . The ground wire resistance must not exceed 0.2 ohms.**

⚠WARNING

Electrical voltage!

Noncompliance can lead to death, physical injury or property damage.

- ➪ **The electrolytic capacitor batteries of the generator and on the generator boards remain charged even after the system has been switched off for a longer period of time. These electrolytic capacitors must be discharged before beginning work on the electrolytic capacitor batteries or on the generator. To do this, set switch D21.S2 to the UZ_OFF position and wait until LEDs D21.X22 and D21.X23 extinguish. Then check the voltage between measuring points X109.UZ_IST(ACT) and X109.ANA_GND. This voltage must equal < 0.2V (corresponding to Uz < 20V).**

⚠WARNING

Danger of pathogen infection!

Noncompliance can lead to death or physical injury.

- ➪ **Since this product has been approved for use in operating rooms, it may be contaminated with infectious blood or other excreta.**
- ➪ **Avoid any skin contact with blood or other excreta!**
- ➪ **The preventive measures against infectious diseases specified in ARTD-002.731.37... must be strictly observed at all times!**

⚠WARNING

X-ray radiation!

Noncompliance can lead to illness, irreversible damage to body cells and the genotype, severe injury and even death.

- **In the case of system work requiring the release of radiation, the radiation protection guidelines and the rules for radiation protection according to ARTD 02.771.02 must be complied with.**
- **Note:**
- **Use available radiation protection devices.**
- **Wear radiation protection clothing (lead apron).**
- **Maintain the greatest possible distance from the radiation source.**
- **Release radiation only if necessary.**
- **Set the radiation activity as low as possible.**
- **Low kV and mA values, short radiation time.**
- **Release radiation as briefly as possible.**
- **Checks requiring the release of radiation are identified by the radiation warning symbol.**

⚠WARNING

Risk of injury on mechanical parts!

If these guidelines are not observed, minor to moderate injury, especially to the hands, can occur.

- **The C-arm of the system is manufactured from a carbon fiber composite material (CFK). In the case of damage to the carbon fiber structure, for example caused by a collision or by cutting or scraping tools, individual carbon fibers or carbon fiber bundles can protrude and cause injury to the skin or can penetrate the tissue of the hand.**
- **Before starting work on the C-arm, make sure that the carbon fiber structures are undamaged (visual inspection).**
- **If smaller superficial damage is detectable in the painted area or in the area of the running surface edges of the C-arm, wear work gloves and remove any projecting carbon fibers. Then carefully rub the damaged places flat with a fine emery cloth and seal the damaged surface with paint. A spray paint the color of the C-arm can be used for this purpose (see Service Tool Catalog).**
- **Remove any carbon fibers lying in the C-arm profile with a damp sponge or cloth.**
- **If greater damage to the carbon fiber structure indicating persistent or large-scale destruction of the carbon fiber structure (e.g. crack formation or flaked off places in the running surfaces with torn carbon fibers) can be detected, replace the C-arm.**

⚠CAUTION

Electrostatic voltage!

Noncompliance can lead to property damage.

- **ESD protection guidelines must be observed when performing service.**

⚠CAUTION

Risk of being burned by hot parts or components!

Noncompliance can lead to minor or moderate burns, especially on the hands.

- **Removing the covers exposes parts or components (e.g. power components, heat sinks, solenoid brakes) which may exhibit temperatures of > 50° Celsius when in operation. To prevent burns, switch off the system power supply before contacting any parts or components and let the system cool off for at least 5 minutes before resuming work.**

⚠CAUTION

Danger of injury when dismantling/assembling mechanical parts!

Noncompliance can lead to minor to moderately severe injury, especially to your hands!

If parts under mechanical stress have to be dismantled or assembled, for example the cover over the horizontal carriage of the basic unit, carelessness can result in injury due to crushing, cutting or grazing of the skin, especially on the hands.

- ➪ **Perform the corresponding work with special care and attentiveness.**
- ➪ **Wear work gloves if necessary.**

⚠CAUTION

Danger of injury on mechanical parts!

Noncompliance can lead to minor to moderately severe injury, especially to your hands!

When the covers are removed, it is possible to come into contact with parts, such as flat plugs, threaded bolts, cut off cable ties or edges of components, from which, if not careful, injury can arise due to crushing, cutting or grazing of the skin, especially on the hands.

- ➪ **Perform the corresponding work with special care and attentiveness.**
- ➪ **Wear work gloves if necessary.**

Tools, measuring equipment and auxiliary devices

Standard installation tools	
Ground wire tester	44 15 899 RV 090
Torque wrench	99 00 846 RE999
Calibration phantom Iso-C 3D with Navi	75 51 620
Drill with right/left spiral (clockwise/counterclockwise)	n.a.
Threader	96 60 093
DMM Fluke 8060A	97 02 101 Y4290
3D reconstruction upgrade kit	80 81 403

Check list prior to installing the 3D option

Check the serial number	.....
A room suitable for the installation is available.	
The tools to be provided by the R.U. are available.	
All auxiliary service tools to be provided by the R.U. are available.	

Actions required prior to installing the 3D option

	OK	Not OK
Functional check of the ARCADIS Orbic 3D in accordance with the operating manual		
Testing as part of the IQ quick test: - The "Checking the ADR characteristics" chapter - The "Resolution" chapter - The "Image interference" chapter		

Covers

- Proceed as follows after the ARCADIS Orbic 3D has been moved to the respective room and the brake has been enabled.

Cover of the X-ray unit

- Remove the cover and reattach it after installing the 3D option.

Horizontal carriage cover

- Remove the cover and connector M3.X1.
- Reattach the cover after installing the 3D option.

Cable module cover

- Remove the cover and dispose of it properly, because this cover will no longer be required.
- Attach the new cover after installing the 3D option.

Centering disk, item no. 71 40 580

Fig. 2: Centering disk

- Remove the countersunk screws prior to mounting the centering disk.
- Attach the centering disk at the cable module (see (Fig. 2 / p. 14)).

C-arm

- Move the C-arm into the 0º position (Fig. 3 / p. 15).
- Apply marks at 20 mm intervals to determine the lateral limit for the cam (Fig. 4 / p. 16).
- Position the cam. Ensure that the cam is flush with the top and mark the holes with the cam laterally at the 20 mm mark (Fig. 5 / p. 16).
- Punch-mark the holes.
- Ensure that shavings or dust do not drop into the C-arm.
- Use a 3.2-mm bit for drilling. Continue until you have have drilled through the wall. Ensure that you are not drilling beyond the wall (Fig. 6 / p. 17).
- Counterbore the holes.
- Cut the threads using an M4 thread tap (e.g. use a tap wrench) (Fig. 7 / p. 17).
- Attach the cam using 2 countersunk screws M 4 x 8 (Fig. 8 / p. 18).
- Repeat these steps on the other side of the C-arm.

Fig. 3: C-arm _ starting position

Fig. 4: Mark distance

Fig. 5: Mark hole

Fig. 6: Drill

Fig. 7: Cutting the threads

⚠WARNING

Risk of injury on mechanical parts!

If these guidelines are not observed, minor to moderate injury, especially to the hands, can occur.

➪ **Observe the safety notes concerning the C-arm carbon fiber structure.**

Fig. 8: Attaching the cam

Limit switches

Fig. 9: Attaching both limit switches

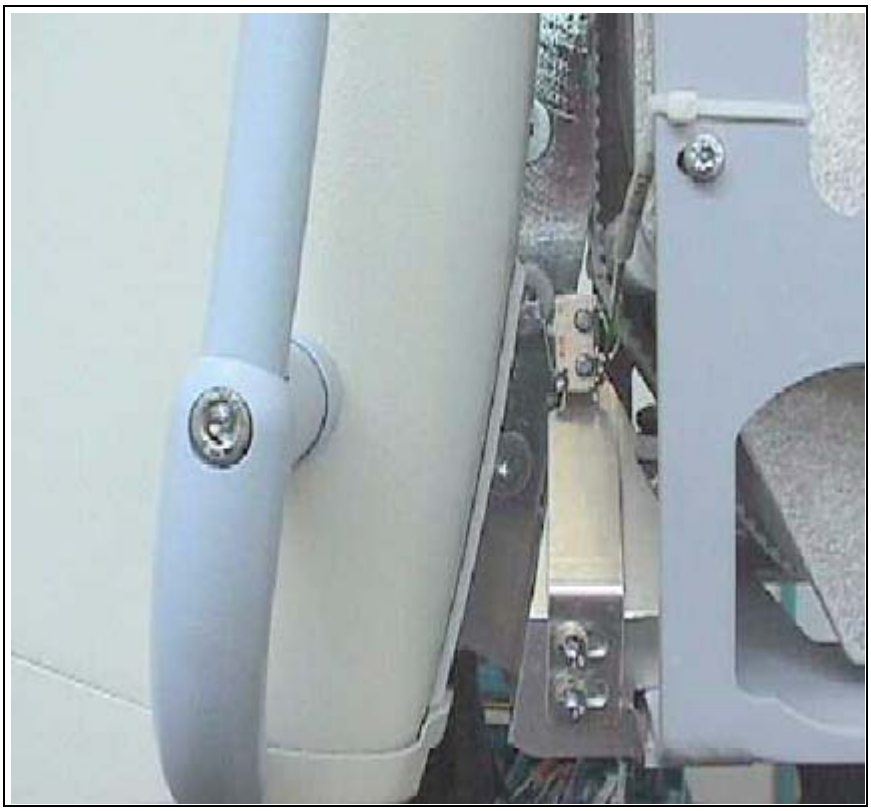

Fig. 10: Limit switch in switching position

- Attach the two limit switches at the cable module using M4 x 8 screws, washers and contact washers (Fig. 9 / p. 19)/(Fig. 10 / p. 19)/(Fig. 11 / p. 20).

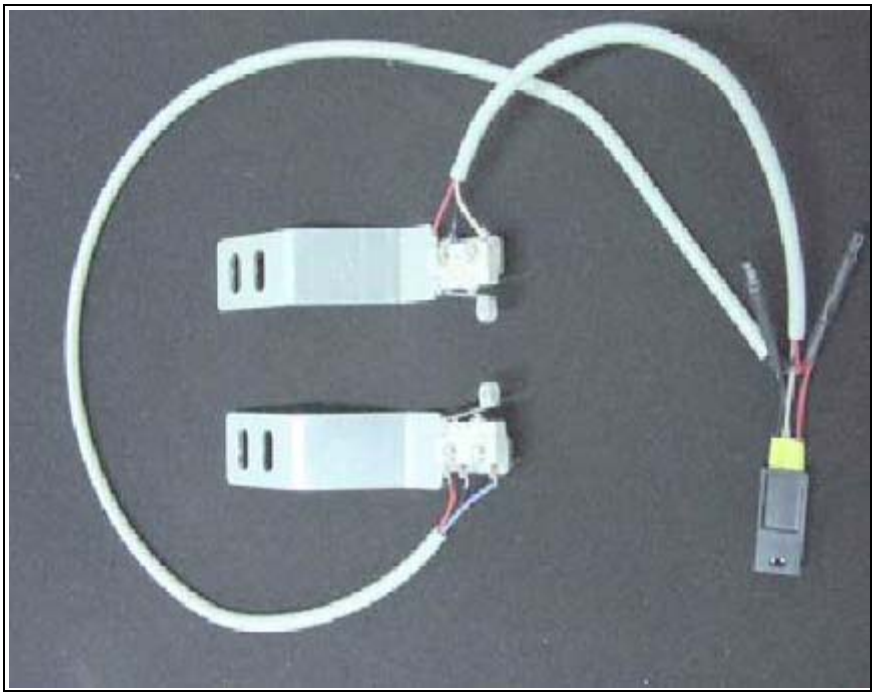

Fig. 11: Limit switch with cabling

Fig. 12: Setting the limit switch

Setting the limit switches

- Manually move the C-arm into the end position.

- Attach the two limit switches so that the cam enables the switching mechanisms at the switches (Fig. 12 / p. 20).
- When set correctly, you can hear the click emitted by the limit switches.
- Angulation 0°.
- Test the functioning of the limit switches by moving the C-arm into the +95° und -95° orbital positions.
- Check these settings at least twice.

Installing the system electronics for 3D reconstruction 71 39 921

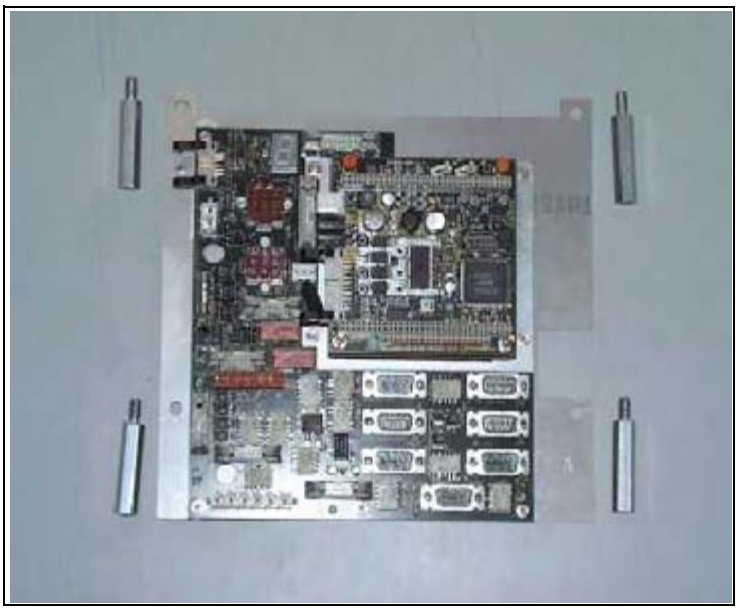

Fig. 13: 3D reconstruction system electronics D200

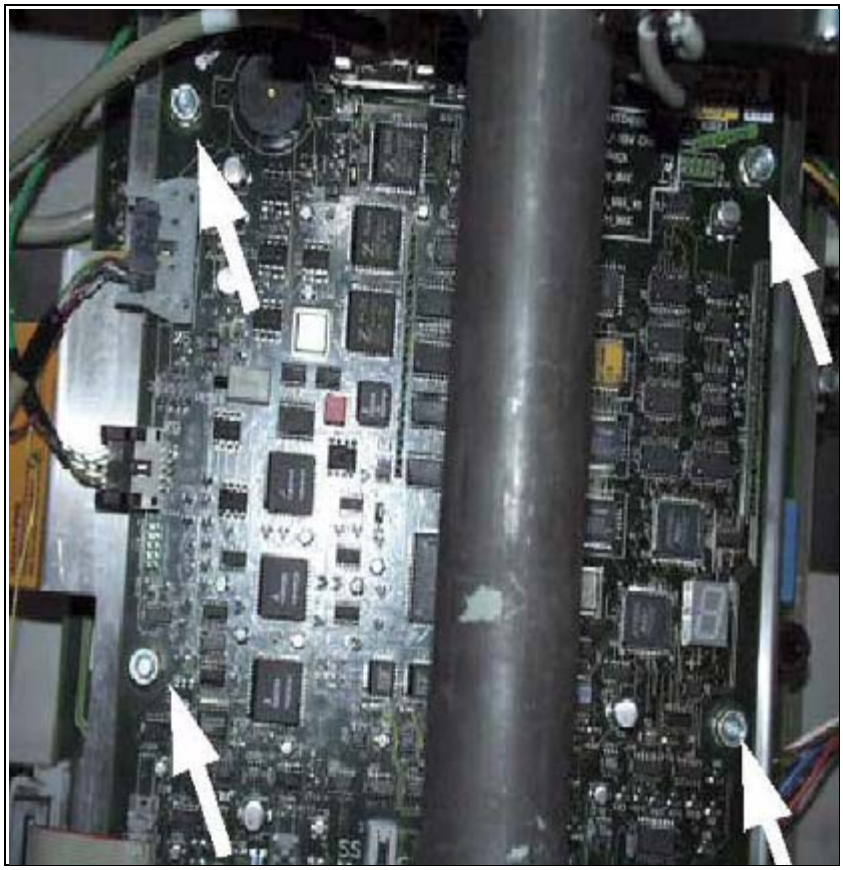

Fig. 14: D1

- Move the lifting column into the top position.
- Remove the 4 upper mounting screws of D1, leave the washers on D1 (Fig. 14 / p. 22).

- Attach the hexagonal bolts (see (Fig. 15 / p. 23)).
- Place D200 on the hexagonal bolts.
- Attach D200 with the contact washers and nuts (Fig. 16 / p. 24).

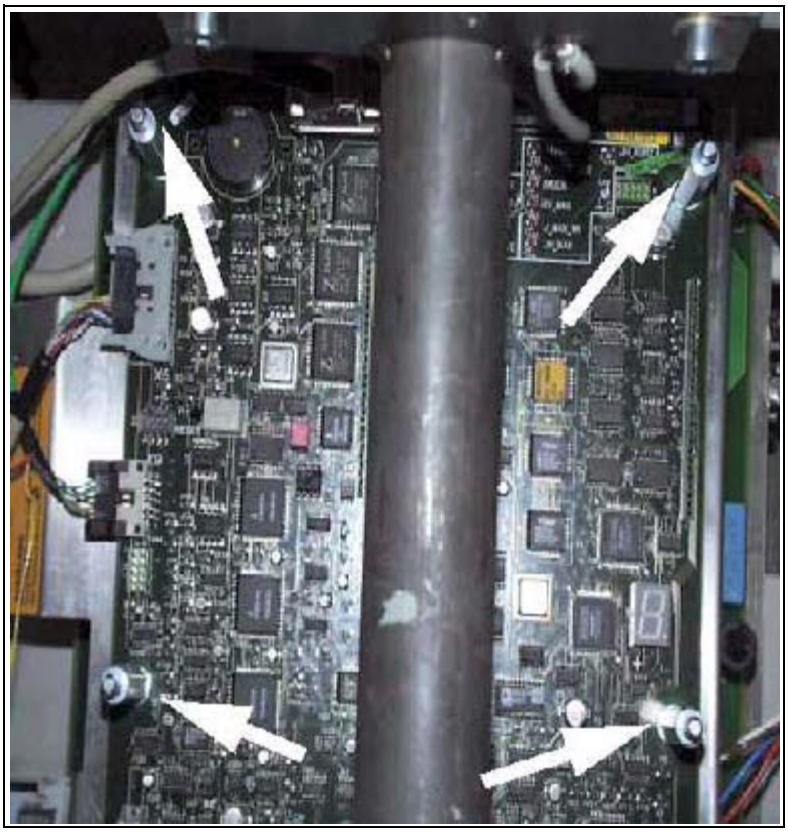

Fig. 15: Mounted bolt

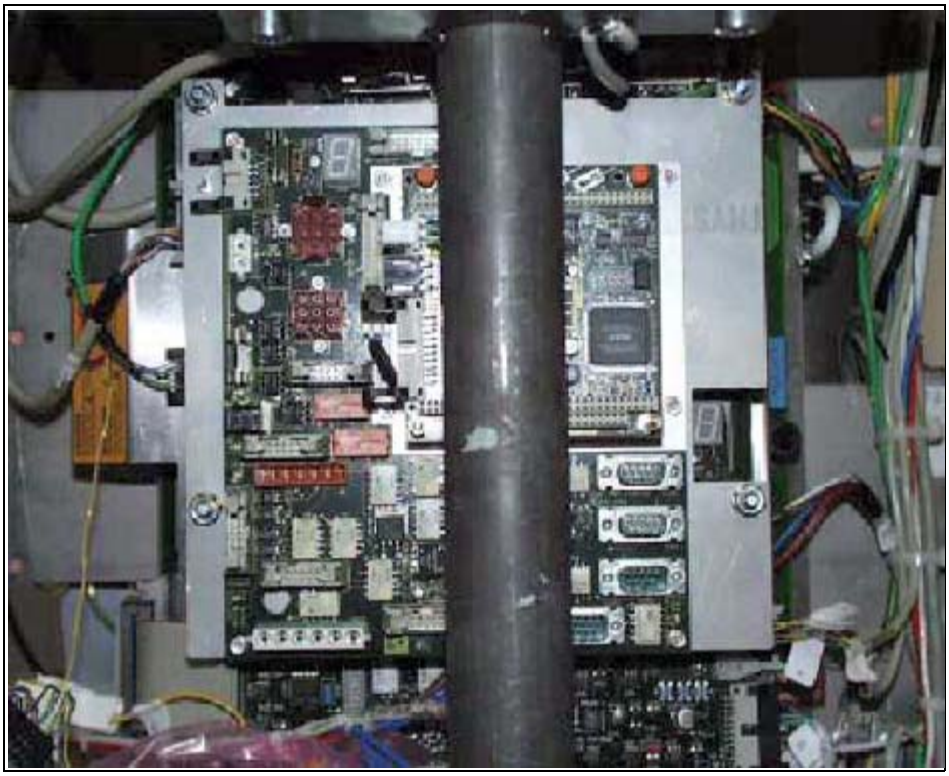

Fig. 16: Installed 3D reconstruction system electronics D200

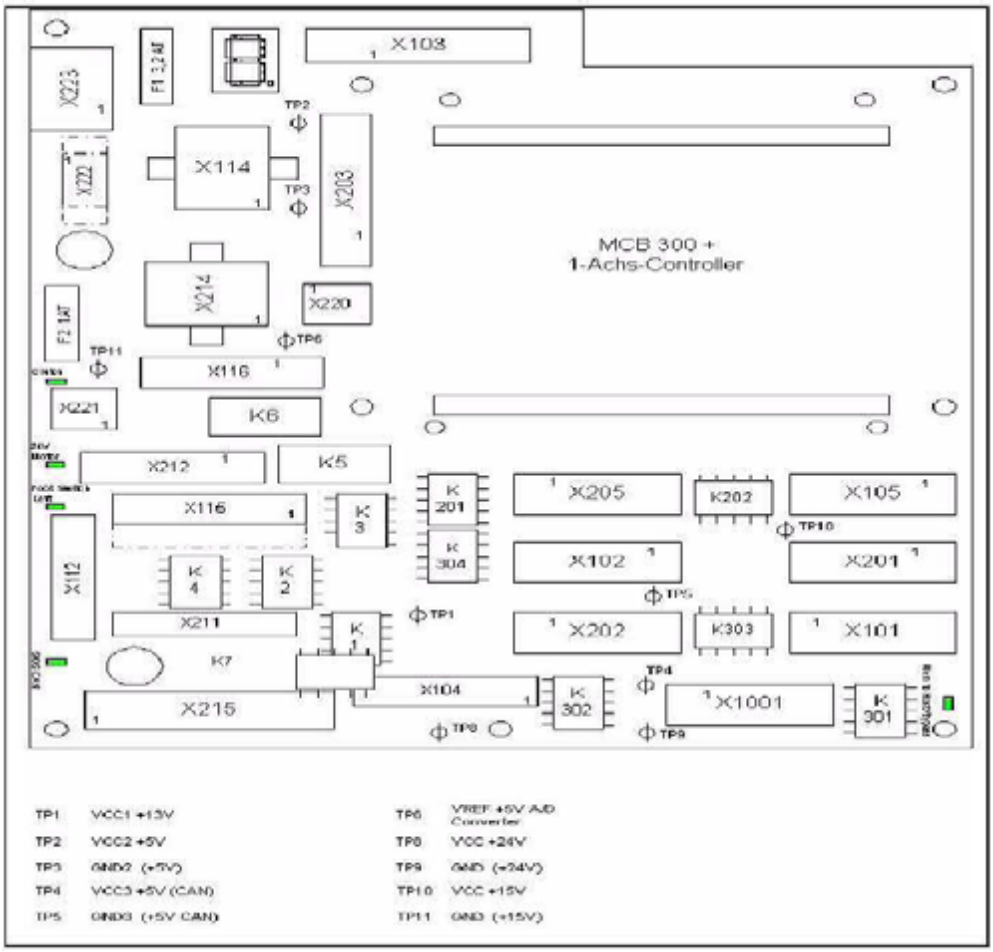

Fig. 17: Connectors D200

NOTE

Cable ties or shielding can be removed as required during installation.

After successful installation, the shielding must be reestablished and the cables secured with the cable ties.

- (Fig. 17 / p. 25) shows the layout of board D200.
- Disconnect plug D1.X3 from PC board D1. Connect the plug to connector D200.X103 on interface PC board D200. Ensure proper locking.
- On D30, reconnect plug D30.X5 to D200.X115 on interface PC board D200. For this purpose, slip the cable out of the existing shielding and reinsert it from the opposite side.
- On D30, reconnect plug D30.X12 to D200.X112 on interface PC board D200. For this purpose, slip the cable out of the existing shielding and reconnect it to the shielding at D200 (interface) (Fig. 18 / p. 27). Retighten the shielding on PC board D30.

Cable no. 3, item number n.a.

- Connect plug D30.X5 on D30 and plug-in location D200.X215 on D200.

Cable no. 4, item number n.a.

- Use ribbon cable no. 4 to establish the connection D200.X203 - D1.X3.

Cable no. 5A, item number n.a.

- Use ribbon cable no. 5A to establish connection D200.X212 - D30.X12.

Cable no. 5B, item number n.a.

Without the LITHOSTAR MODULARIS option:

- Use ribbon cable no. 5B to establish connection D200.X211 - D30.X11.

Cable no. 2, item number n.a.

- Disconnect plug D30.X4 on D30.
- Insert extension cable no. 2 at plug D30X4A to D30.X4.
- Insert plug D200.X114 on PC board D200.

Cable no. 1, item number n.a.

- Connect cable no 1. to plug D30.X4 on D30 and to plug D200.X214 on D200.

Cable no. 6, item number n.a.

- Connect cable no. 6 to plug D200.X220 on D200 and to D10.X12 on PC board D10.

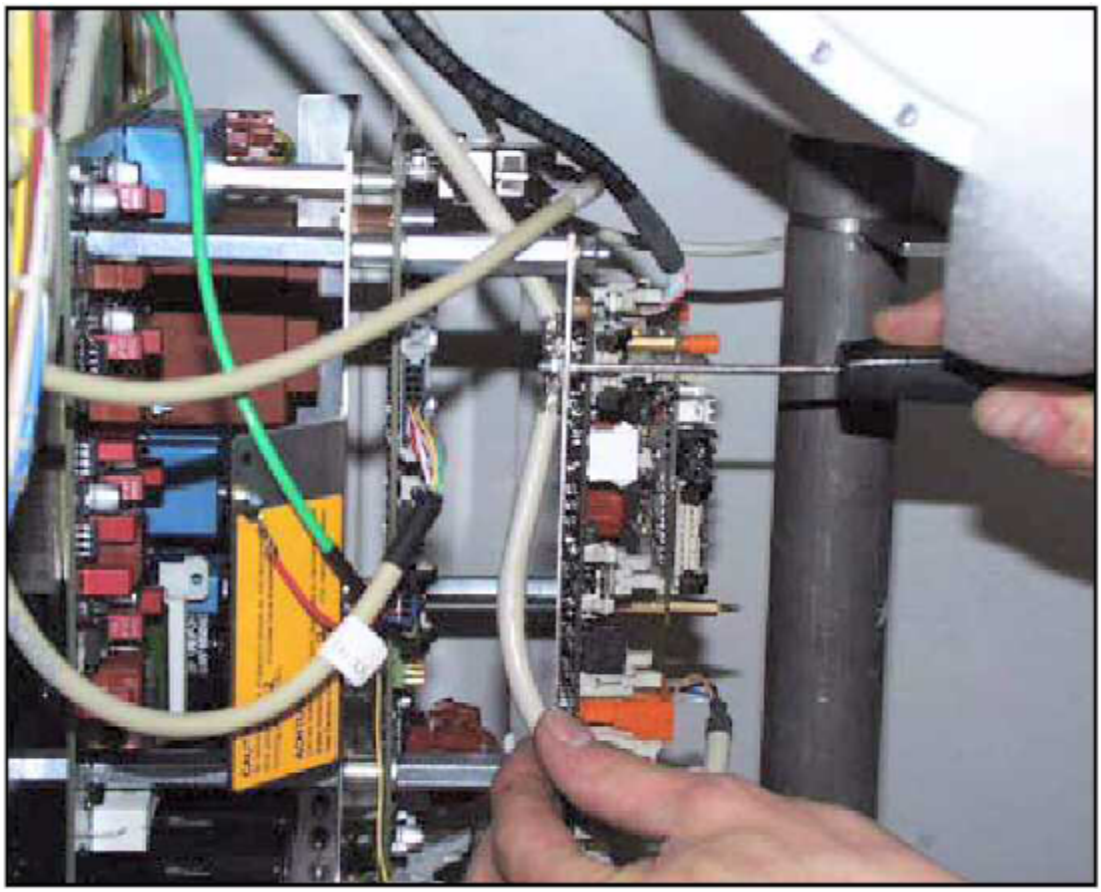

Fig. 18: Shielding connection D200

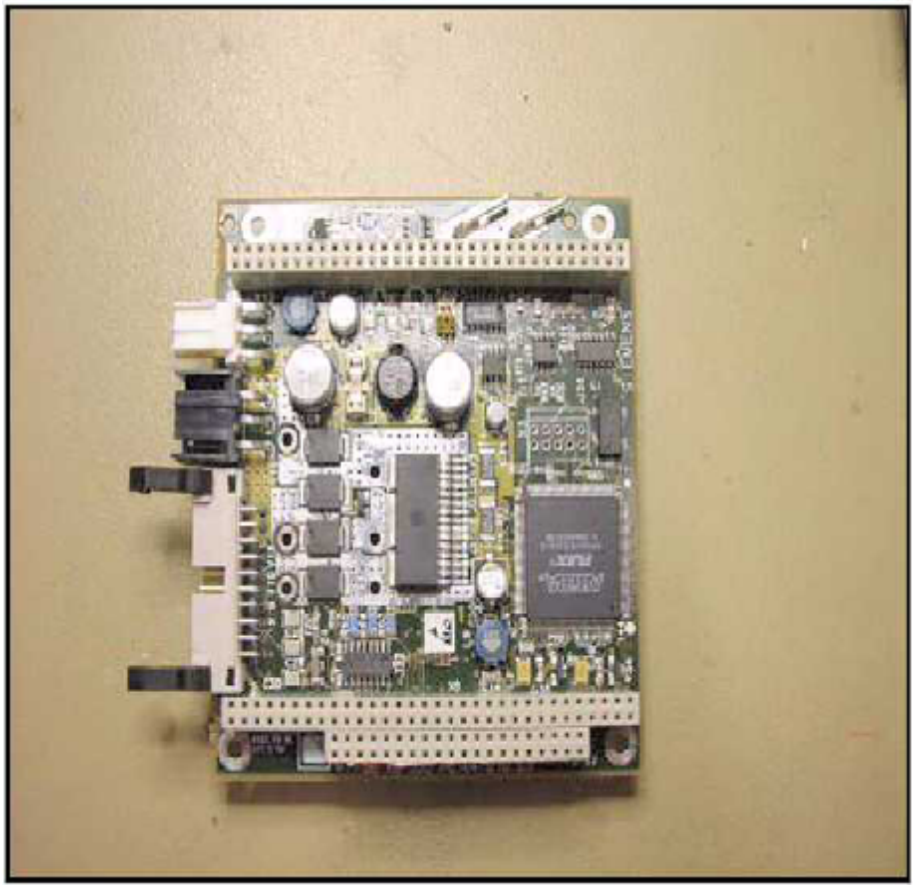

Fig. 19: PC board D10

Orbital drive cable set, item no. 71 39 970

- D10 is inserted into PC board D200 (Fig. 19 / p. 28).
- Proceed as follows with respect to the previously routed orbital drive cable set.
  - Insert plug D10.X11into plug-in-location D10.X11 on PC board D10 .
  - Insert plug D10.X10 into plug-in-location D10.X10 on PC board D10.
  - Insert plug D200.X116 into plug-in-location D200.X116 on PC board D200.
  - Insert plug D200.X221 into plug-in-location D200.x221 on PC board D200.

Installation USB/CAN converter

- Open the side and back covers of the monitor trolley (see (Fig. 20 / p. 29).
- Secure the USB/CAN converter (see (Fig. 21 / p. 29)) with cable ties (see (Fig. 22 / p. 30))

Fig. 20: Covers

Fig. 21: Kit

Fig. 22: Plug_1

- Connect the USB plug of the USB/CAN converter to the PC (see (1/Fig. 23 / p. 31)).

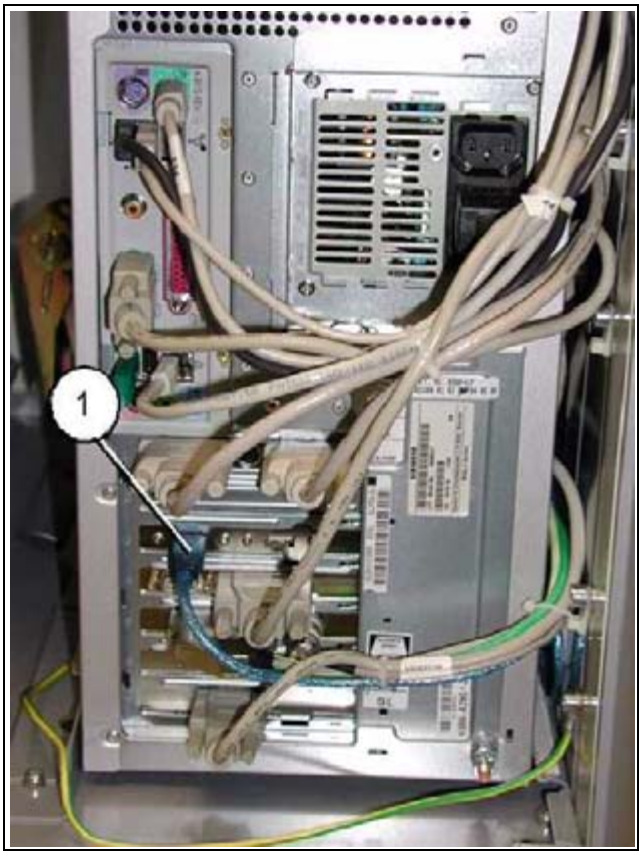

Fig. 23: Plug_2

Fig. 24: Plug_3

- Connect the CAN plug (see Fig. 21) to the USB/CAN converter (1/Fig. 20).
- Close all covers of the monitor trolley.

Orbital drive

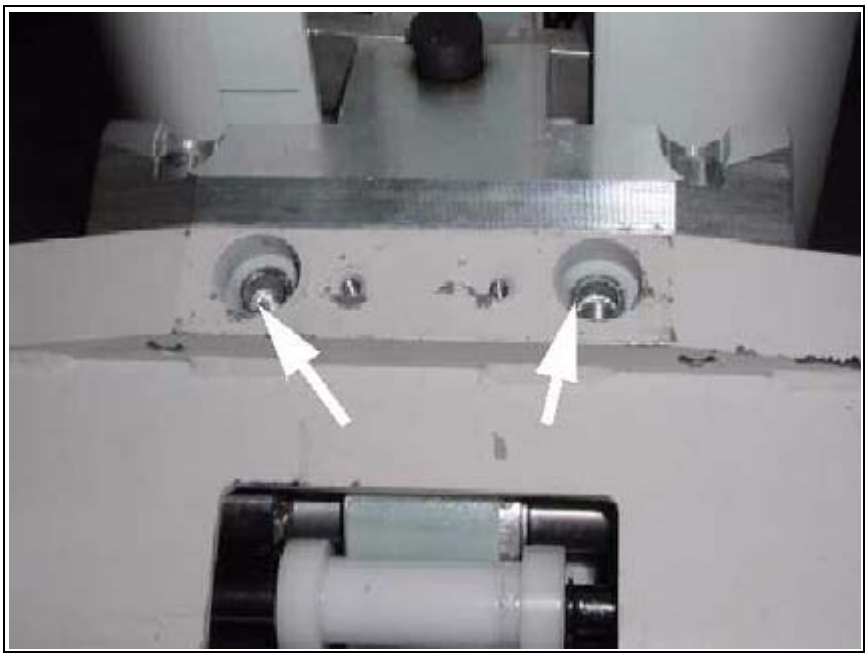

Fig. 25: Screws removed

Fig. 26: Attached motor unit

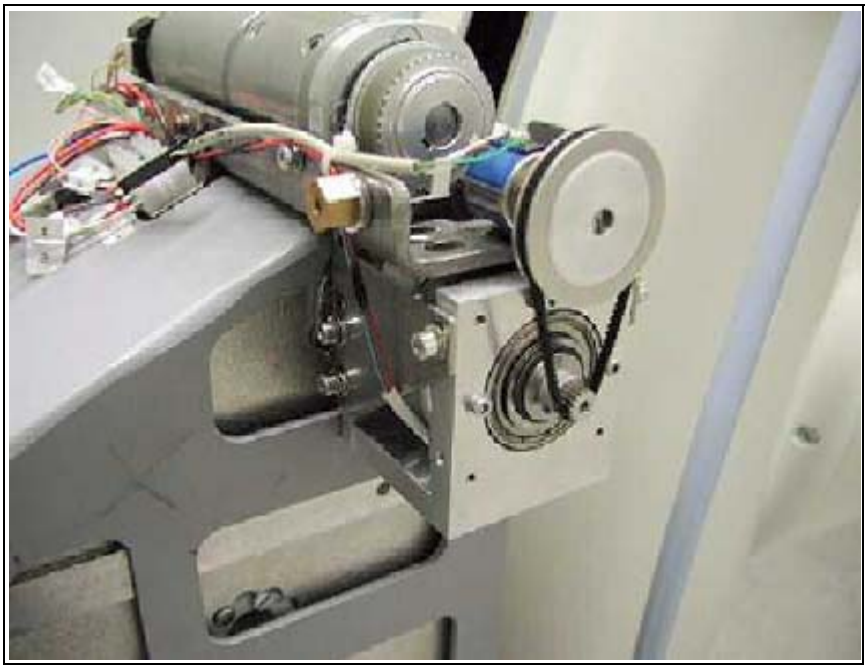

Fig. 27: Orbital drive fully installed

- Remove the two existing screws (Fig. 25 / p. 32).
- Attach the motor using 2 countersunk Allen screws M 8 x 40 (Fig. 26 / p. 32).

Coupling unit

Fig. 28: Centering disk

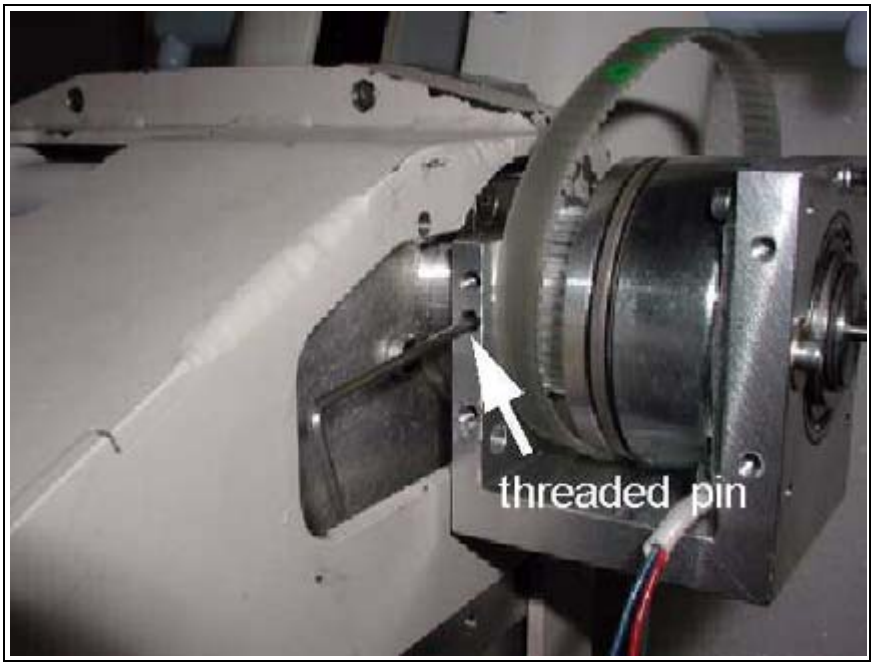

Fig. 29: Coupling unit

- Fit the coupling unit onto the centering disk, the shaft must engage with the connecting piece (Fig. 28 / p. 33).
- Press the coupling unit against the centering disk and attach it to the left and right using the two threaded pins (Fig. 29 / p. 34).

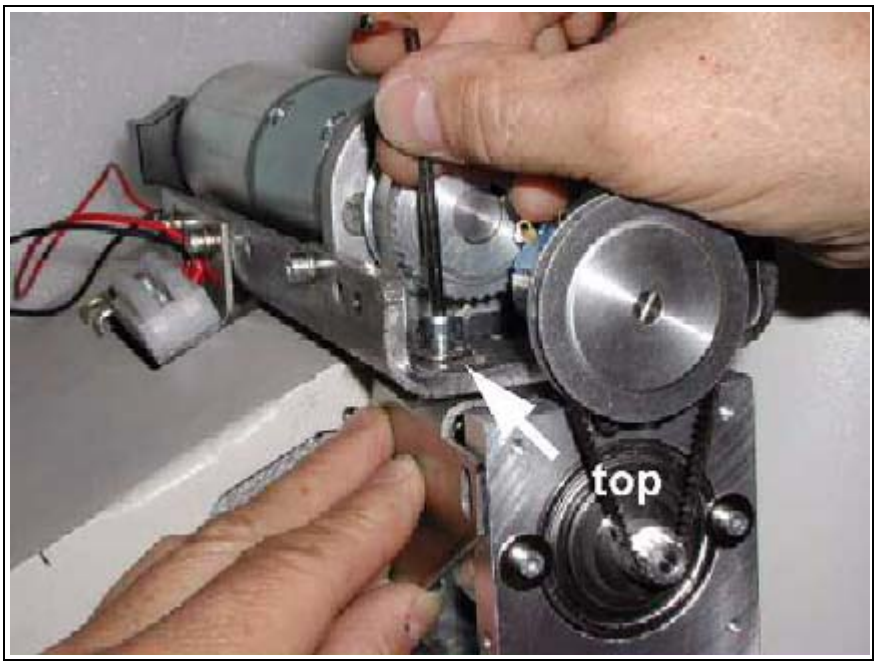

Fig. 30: Lateral bracket

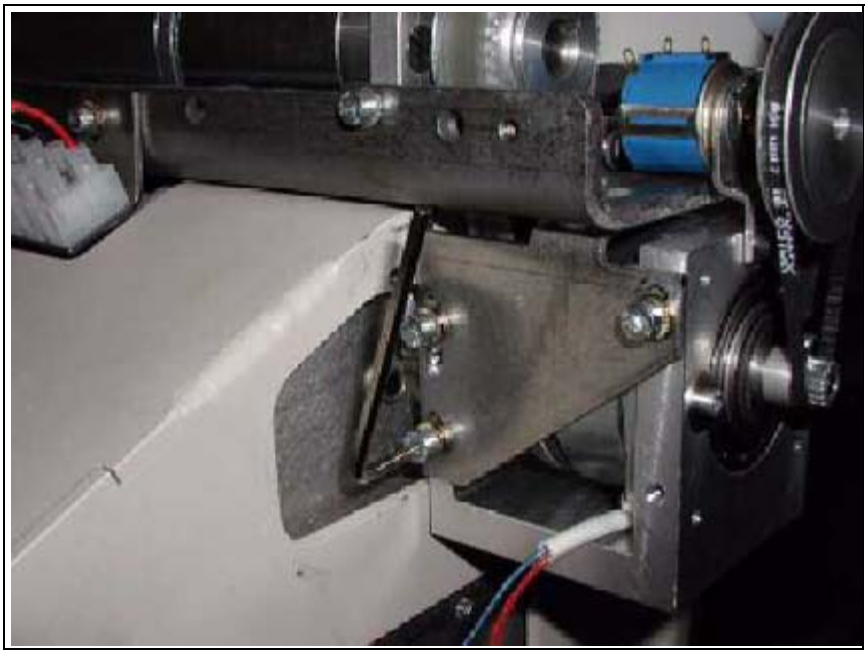

Fig. 31: Lateral bracket_1

- Attach lateral brackets (Fig. 30 / p. 34) on both sides (Fig. 31 / p. 35), first on top and then on the side; use big washers.

Fig. 32: Toothed belt

Fig. 33: Belt tensioning

- Loosen the belt tightener at the coupling unit (Fig. 32 / p. 35).
- Install the wide toothed belt on the motor (Fig. 32 / p. 35).
- Tighten the belt. On the opposite side of the belt tightener, it should be possible to press the belt down approx. 2 - 3 mm with your thumb (Fig. 33 / p. 36).

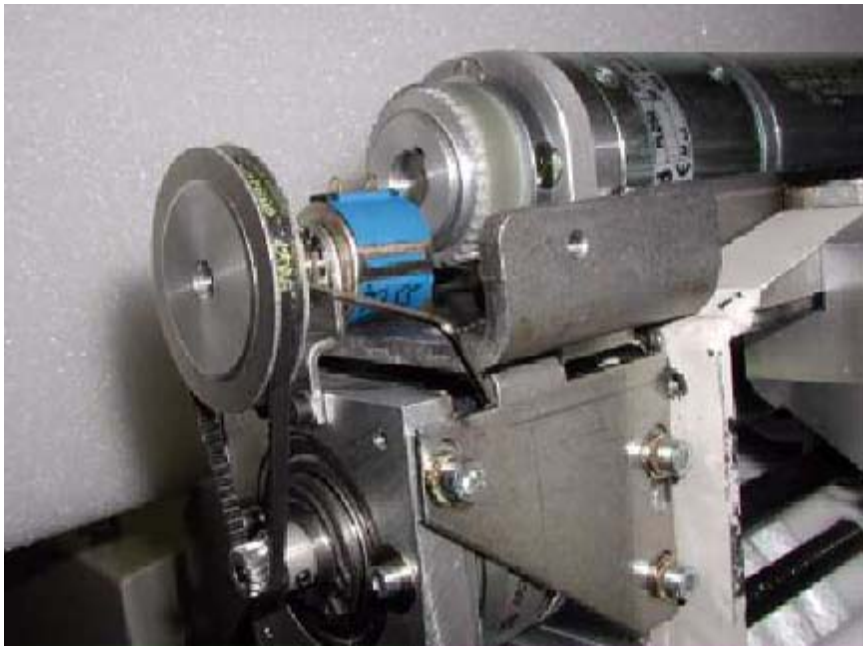

Fig. 34: Belt pulley

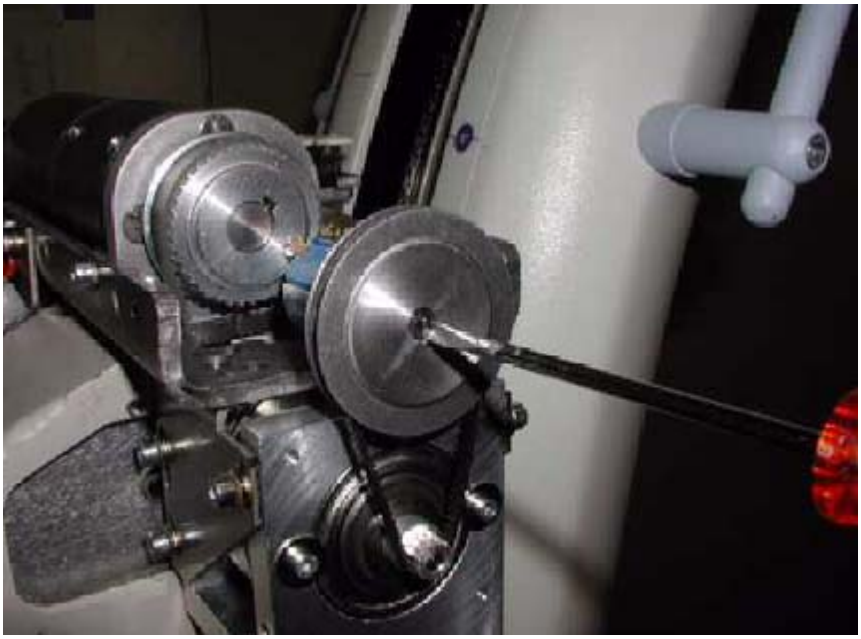

Fig. 35: Potentiometer

- Move the C-arm into the -95° degree orbital position (limit switch = side of image intensifier).
- Loosen the Allen screw at the belt pulley (Fig. 34 / p. 36).
- Attach the outside toothed belt (see (Fig. 34 / p. 36).
- Use a screwdriver to turn the potentiometer counterclockwise into the end position (Fig. 35 / p. 37).
- Once the potentiometer is in this position, turn it fully clockwise twice.
- Secure the belt pulley with the Allen screw (Fig. 34 / p. 36).

Angulation measurement

Fig. 36: Mounting screw

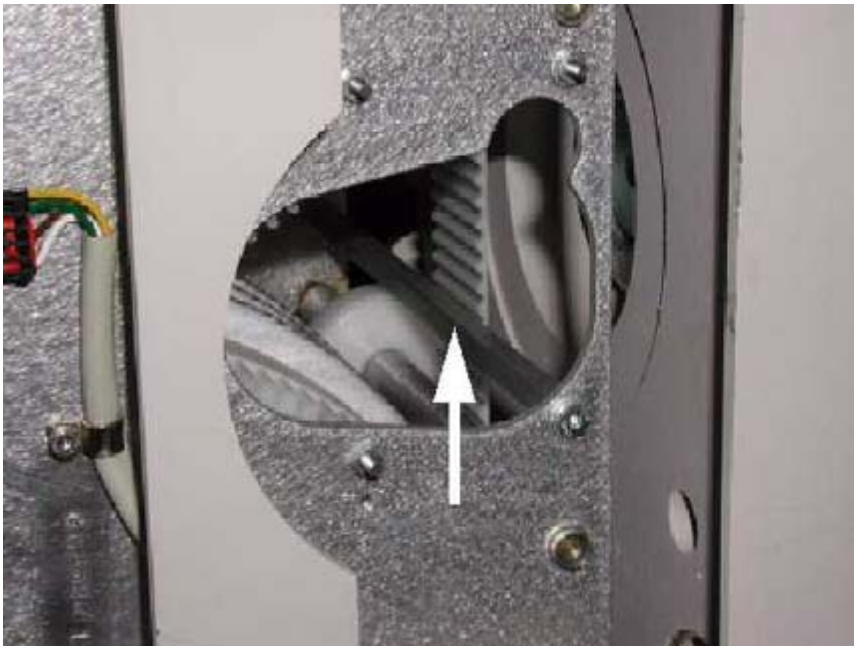

Fig. 37: Square bar in cable module

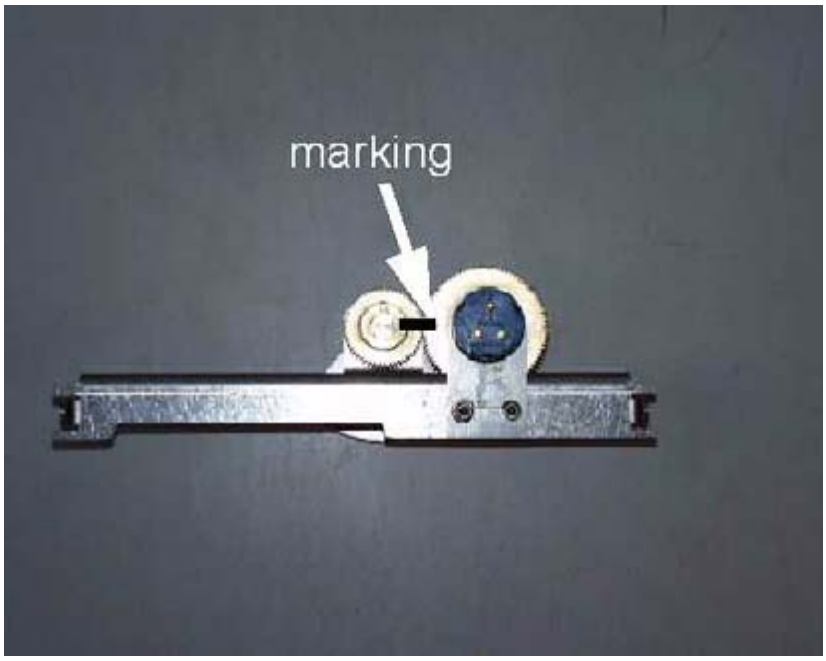

Fig. 38: Pre-mounted angulation part with marking

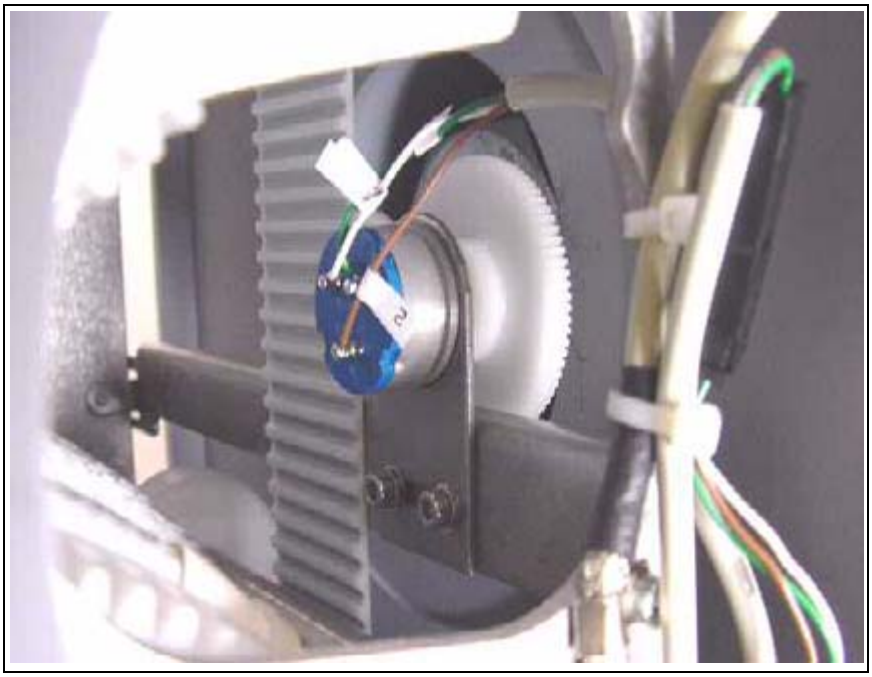

Fig. 39: Installed angulation part

- Remove the square bar from the cable module (see (Fig. 38 / p. 39) and (Fig. 39 / p. 39)).
- Move the angulation part into the cable module and attach it with screws (Fig. 41 / p. 40). Ensure that the markings (black lines) on the two gear wheels match exactly (Fig. 40 / p. 40).
- Secure cables with cable ties.

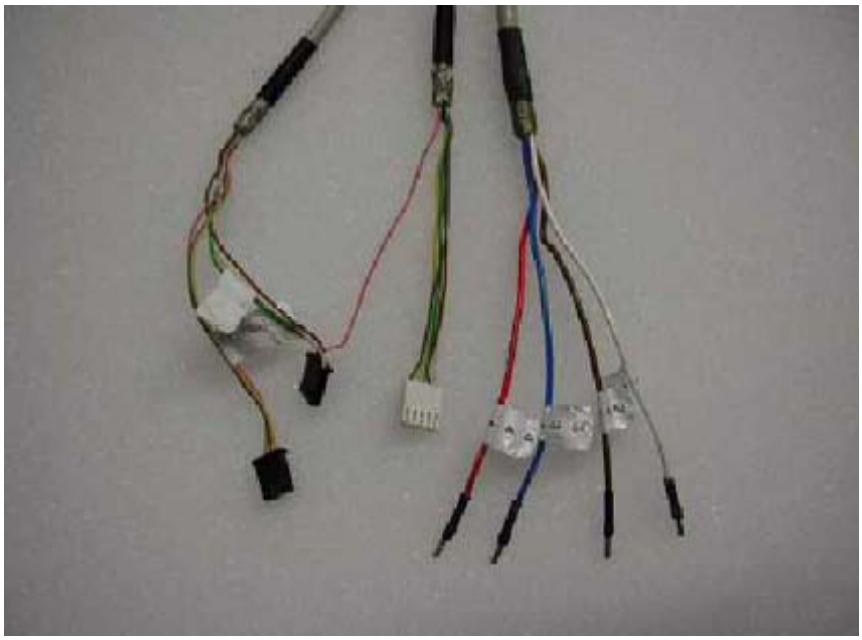

Fig. 40: Connectors_cable set for orbital drive

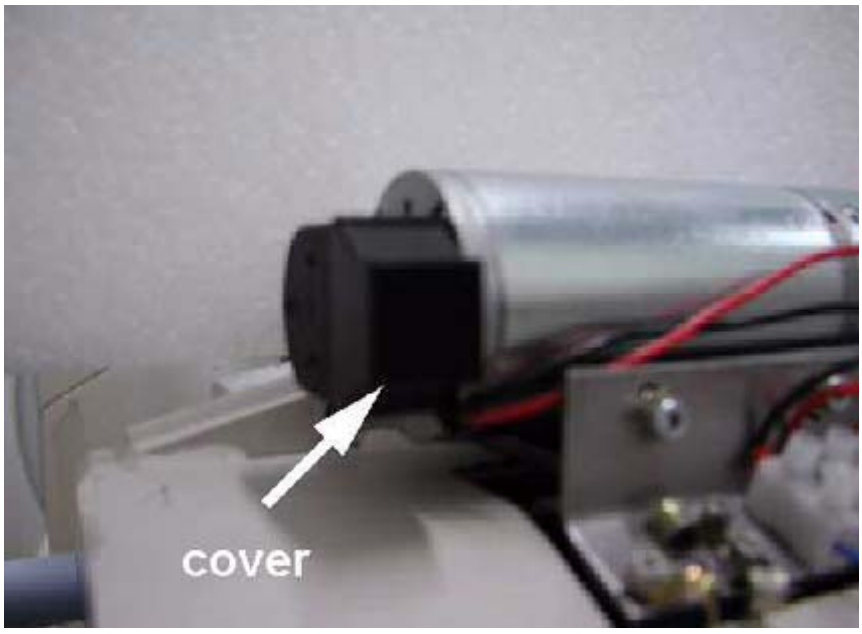

Fig. 41: Plug in encoder

- Remove the cover from the encoder (Fig. 43 / p. 41).
- (Fig. 42 / p. 41) shows the plugs from the limit switch cable of the orbital drive.
- Connect the encoder plug of the encoder cable to the encoder plug under the cover.
- Connect the angulation plug of the cable of the angulation part to the X4 plug of the orbital drive cable set.
- Connect the limit switch plug of the limit switch cable to the limit switch plug of the orbital drive.

Fig. 42: Terminal blocks

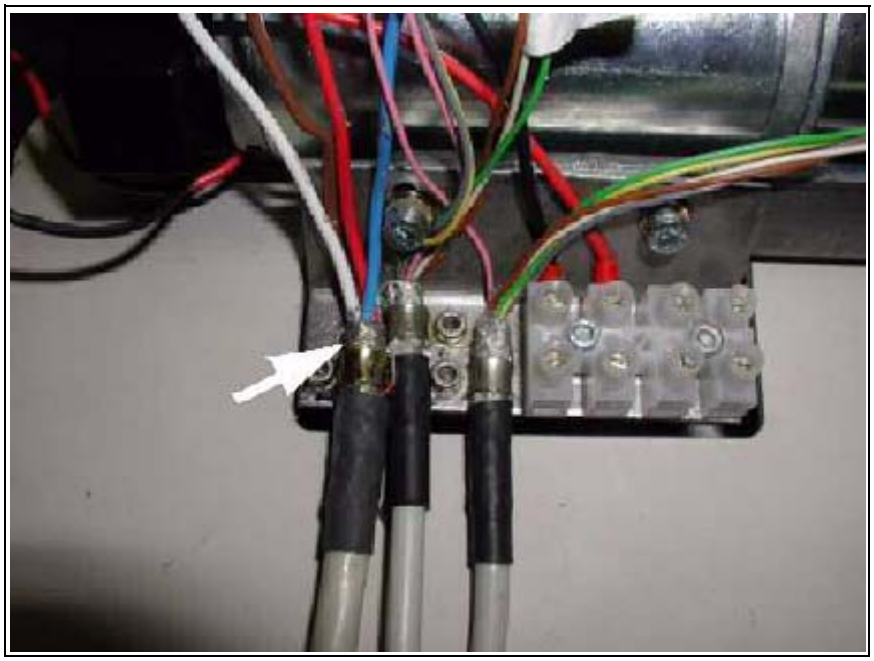

Fig. 43: Shielding

- Secure the shielding and attach it with screws (Fig. 45 / p. 43).
- Connect cables 1 through 4 to terminal blocks 1 through 4 ((Fig. 44 / p. 42) and (Fig. 46 / p. 43)).

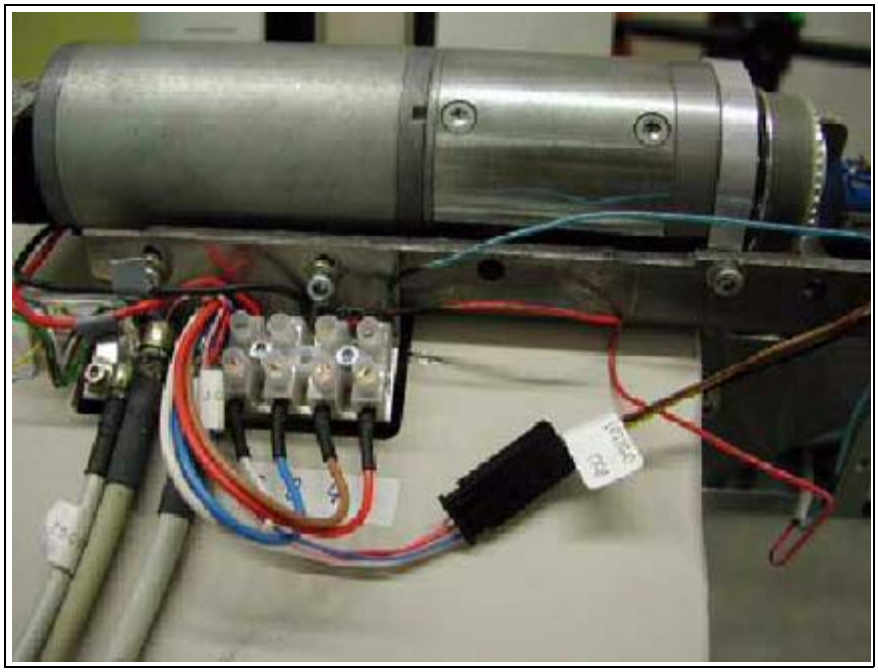

Fig. 44: Connecting the terminal block

- Clamp the red cable of the coupling unit to terminal block 3.
- Clamp the blue cable of the coupling unit to terminal block 4.

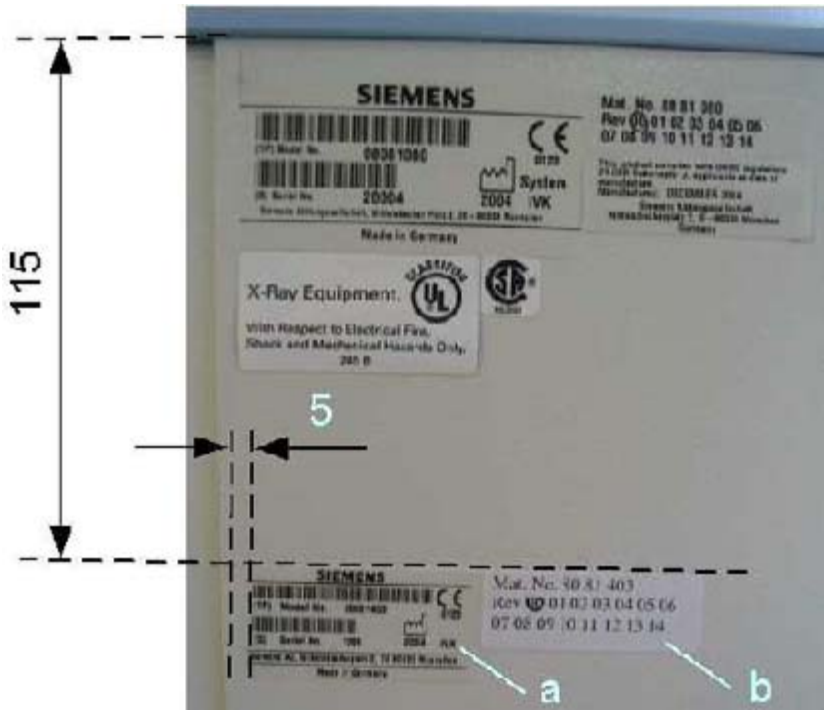

Fig. 45: Labels_1

Fig. 46: Label_3

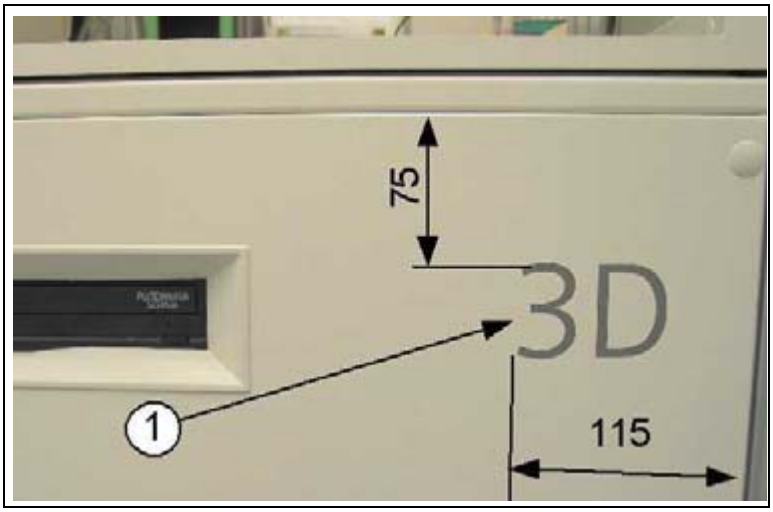

Fig. 47: Label_4

- Attach the large and small label for 3D reconstruction to the unit as shown in (a/b/Fig. 45 / p. 43).
- Affix the safety label to the cover of the cable module as shown in (Fig. 46 / p. 43). Also affix the second safety label to the cable module cover on the opposite side of the other label.
- Affix the 3D label to the ARCADIS Orbic C-arm (see (1/Fig. 46 / p. 43)) and the monitor trolley (see (1/Fig. 47 / p. 44)).

Checking C-arm movement for ARCADIS Orbic 3D

Proceed as follows after reconfiguring the basic unit and the monitor trolley.

- Connect the cables in the zipper hose to the basic unit.
- Connect the monitor trolley to the line voltage.
- Release the orbital brake.
- Manually move the C-arm into both end positions. The movement has to correspond to "normal" C-arm movement. If not, verify that connector M3.X1 for the brake assembly is inserted correctly. If yes, the LEDs in both keys light up.

The next step

Continue with ARCADIS Orbic Start-up Instructions SPR2-320.815.02... and Image Quality Assurance Test SPR2-320.820.02.. .

Perform a complete functional check.

n.a., new version